

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: HECKMANN, et al.	Docket: 2004DE106
Serial No.: 10/591,575	Group Art Unit: 1795
Filed: 11/29/2006	Examiner: Vajda, Peter L.
For: Violet Colorant For Colour Filters, Inks For Ink-Jet Electrophotographic Toners And Developers And E-Inks	

**DECLARATION UNDER 37 CFR 1.132**

Mail Stop:  
Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

I, Dr. Hans-Tobias Macholdt, state that I am a resident of D-64297 Darmstadt-Eberstadt, Federal Republic of Germany; that I am a citizen of the Federal Republic of Germany; that I am a chemist having graduated at the University of Darmstadt, Federal Republic of Germany; that I am one of the inventors of U.S. Patent Application Serial No. 10/591,575; for "Violet colorant for color filters, inks for ink-jet, electrophotographic toners and developers and e-inks." that I consider myself qualified, by my knowledge of chemistry, and especially of triphendioxazine pigments and color filters and by my 22 years experience in this field; that I can make the following observations and statements to wit:

**(A) Color filters in industry**

Color filter displays find application in a very wide variety of electrooptical systems, as for example in screens of desktop monitors, in computer screens,

screens of portable computers (laptops), PDAs (personal digital assistants), and also in cell phone, video camera, GPS (global positioning system), and other monitors, and also, generally, in liquid crystal and charge-coupled devices, in plasma displays or in electroluminescent and other displays. For the violet hue and for the tinting of blue hues, colorants based on C.I. Pigment Violet 23 are of particular interest on account of the color shade.

P.V. 23-based pigments presently on the market, however, have deficiencies in terms of the image contrast, and consequently can be used either not at all or only with restrictions.

Color filters are manufactured using particularly finely divided pigments in order that particle scattering, which leads to a reduction in contrast ratio, may be substantially foreclosed.

Contrast ratio (CR) is measured by determining the light intensity after irradiation through a pigmented coating layer on a transparent substrate placed between two polarizers. Contrast ratio is the ratio of the light intensities for parallel and perpendicular polarizers.

#### **(B) Representing the state of the art**

One of the PV 23 pigment which is said to be useful for color filter systems is a PV 23 finely divided by a salt milling process as disclosed in US 2004/0261662 (Grandidier et al.). In the experiment below, I have determined the contrast value of PV 23 pigment according to Grandidier.

The PV 23 had a d50 of 39 nm and therefore is finely divided to meet color filter requirement.

#### **Determination of contrast values:**

To 10.0 g of pigment were added 24.1 g of methoxypropyl acetate solvent, 5.0 g of n-butanol, 10.9 g of a polymeric dispersing agent (Disperbyk 2001) and

50 g of a 10 weight-% solution of an acrylic resin (Joncryl 611) in methoxypropylacetate solvent.

After further addition of 250 g of 0.3 mm Zirconia beads the mixture was dispersed for 5 h on a paint shaker to obtain a violet mill base. The beads were filtered off and the 20 g of the mill base were mixed with 22 g of a 5.45 weight-% solution of an acrylic resin (Joncryl 611) in methoxypropylacetate solvent by shaking for 10 min in a paint shaker.

The resulting dispersion was spin-coated on glass plates using a POLOS Wafer Spinner and dried at 80°C for 10 min in a drying oven. Using a spectrophotometer (Model Datacolor 650) the coloristic (x,y,Y) coordinates were determined on the glass plates, followed by contrast measurement with a Tsubosaka CT-1 contrast tester. The resulting measured contrast ratios were compared at  $y = 0.05$ , with setting the relative contrast of sample (C) below to 100%.

Result: Contrast value 1,3 %, relative to sample (C) below.

**(C) Representing the present invention:**

A color filter grade PV 23 pigment preparation was prepared as described in Example 1 of U.S. Patent Application Serial No. 10/591,575.  $d_{50} = 47$  nm. The relative contrast value was determined as described above and set to 100 %.

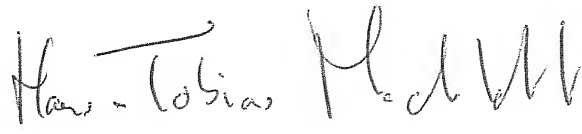
**(D) Evaluation of Results:**

It was quite surprising that a pigmentary additive as claimed in U.S. Patent Application Serial No. 10/591,575 which was hitherto unknown to be useful in color filter applications improves the contrast value of Pigment Violet 23 such effectively as shown above.

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Frankfurt am Main,

Date: October 20, 2010

A handwritten signature in black ink, appearing to read "Hans-Tobias Macholdt". The signature is written in a cursive, somewhat stylized script. The first part "Hans-Tobias" is written in a more legible hand, while "Macholdt" is more fluid and cursive. The signature is positioned above a horizontal line.

Hans-Tobias Macholdt